AJPMHS GLOBAL RESEARCH NETWORK

AMERICAN Journal of Pediatric Medicine and Health Sciences
Volume 02, Issue 2, 2024 ISSN (E): 2993-2149

The Role of Fluoride-Containing Toothpastes in Hygienic Oral Care in Children

Akhunjonova G. M.
Assistants at the Department of Therapeutic Dentistry of
Andijan State Medical Institute

Iminjonova G.R.
Assistants at the Department of Therapeutic Dentistry of
Andijan State Medical Institute

Abstract: This article presents data on oral hygiene items and products for children, as well as rules and features of their use. Pediatric dentists recommend hygienic oral care for children before teething. The first hygiene items may be finger pads and sanitary napkins. Teeth brushing should begin after the first teeth appear. Indications for the use of toothpastes in children and training for adults in their use are described in order to obtain the benefits of using fluoride-containing toothpaste.

Key words: children's items and oral hygiene products, fluoride toothpastes, dosage

Over the past few decades, dentists have paid special attention to increasing the prevalence of caries among young children. Among the main risk factors for dental caries in children, early infection should be highlighted cariogenic microorganisms, poor oral hygiene, night feeding of sugar-containing liquids and defects in the development of tooth enamel. Thanks to developed during dental research measures of primary and secondary prevention this disease can be successfully treated averted. However, not all of these measures are effectively used by dentists due to various circumstances: lack of time for preventative reception work, lack of awareness, lack of confidence in their effectiveness [1,2].

One of the cornerstones of preventing dental diseases is oral hygiene. Most effective and feasible strategy to combat caries in children childhood is an introduction healthy oral hygiene habits and promoting at-home dental care practices. Lack of special items and hygiene products for children, in the past it was not allowed to talk about brushing children's teeth when they were younger two years. Today's situation has changed: hygiene products and items are widely available to start hygiene care for the oral cavity of a child from four months. In this regard, dentists need to constantly update their knowledge about a wide range of oral hygiene items and products, as well as the rules and features of their use [5,6].

At the first sign of teething, parents should begin wipe gums and mucous membranes oral cavity using silicone finger brushes or special napkins and disposable finger pads: "DentalWipes", "Lovular", Jack n' Jill. Rubbing removes any remaining liquid from the surface of the gums and teeth. At the same time, the baby's gums are massaged, helping to reduce discomfort associated with teething, and blood circulation improves. In addition, napkins and finger pads are soaked in a 20–40% solution xylitol, which stimulates salivation, increases the buffering capacity of saliva and inhibits growth and reproduction Str.mutans. These napkins can also be used after complete teething to remove plaque and food debris, when brushing with a toothbrush is impossible (on the road, on a walk, at a party). Wiping prepares your child for a smooth transition to using a toothbrush [3,4].

After the first teeth have erupted to approximately 1/2 the height of the crowns, you should begin cleaning with toothbrush. Requirements for children's toothbrushes: small head, comfortable long handle (for adults to hold), soft artificial bristles with rounded tips. Most manufacturers of children's toothbrushes produce them for the appropriate age [7].

Teeth cleaning procedure. To carry out the teeth cleaning procedure you need good visibility and access to the child’s teeth. Good restraint of the child is also important to prevent injury. Cleaning the first teeth and massaging the gums can be done by placing the baby on the changing table. In this situation, it is necessary to make a “nest” of pillows or towels around the child’s head to keep it stable position, and hold the child’s hands with your free hand. With a free hand, an adult has the opportunity to hold the baby’s hands, while parents and the child can see each other, which will allow them to communicate. You can give your child a second toothbrush or toy as a distraction. As your child gets older, it is very practical to brush his teeth immediately after eating while he is sitting in his highchair. In the bathroom, it is convenient to brush your child’s teeth while standing behind his back, lifting his upper lip with his free hand and holding his head in place. Particular attention should be paid to careful removal of dental plaque from the gingival region [8].

If you start brushing your teeth at an early age, then the child will perceive it as part of the ritual - calmly and willingly. There may be times when children categorically refuse to brush their teeth. In such situations, any distractions will help: you can tell a story, sing a song, introduce the brush to your favorite cartoon character. If a child categorically refuses to brush his teeth, then it is better to reschedule brushing until he watches a cartoon or his favorite TV show. In such cases, the task of adults is to show ingenuity and creativity. All this will work when brushing teeth is an obligatory part of the parents' lifestyle [11,12].

The main means of oral hygiene for children is toothpaste, so dentists should teach parents to understand the range of toothpastes on the market. Toothpastes for children consist of various treatment and prophylactic additives (enzymes, xylitol, herbal extracts, calcium supplements, fluorides) that help remove plaque and improving the mineralization of hard dental tissues. However, clinical studies based on the principles of evidence-based medicine confirm the role in caries prevention exclusively with fluoride-containing toothpastes [10].

In the UK, when fluoridated toothpastes were not widely used, a comparative study was carried out study of various methods of prevention in children. Fluorinated and hygienic pastes were used in two preventive groups under adult supervision. In the comparison group, brushing teeth

with hygienic toothpaste was not controlled. In both preventive groups observed significant reduction in plaque and gingivitis index compared to the control group, but significant a decrease in the increase in dental caries was recorded among children who used fluoridated toothpaste. Moreover, brushing your teeth with a toothbrush will not effectively remove plaque from the most caries-prone areas of the tooth: pits, fissures, proximal surfaces, which casts doubt anti-caries effect of mechanical removal of dental plaque. Therefore, the decrease in the prevalence of dental caries is explained by the influence of fluoridated toothpaste. The use of homemade fluoridated toothpaste provides a 24% reduction in caries of permanent teeth in children and adolescents compared to placebo. The authors of a recent randomized study in Germany on the use of toothpaste with a concentration of fluoride 500 ppm in children 2–4 years old age in children's institutions within three years also report a 24% reduction in caries of primary teeth [13].

0Toothpastes contain various fluoride compounds: sodium fluoride, sodium monofluorophosphate, organic aminofluoride, tin fluoride. All types of fluorides have good solubility, are able to release fluoride ions, retain stability in an aqueous environment and do not stain demineralized areas of enamel. Comparative analysis of properties fluorine compounds showed that physicochemical and biological properties make aminofluoride more effective in the prevention of dental caries compared to other fluorine compounds. High clinical effectiveness aminofluoride has been confirmed in more than 400 scientific studies. Some of the most famous and widely used toothpastes containing aminofluoride are the Parodontax, Elgydium, Splat line toothpastes (Russia) [14].

It has been proven that fluorides have predominantly local cariesstatic effect. However, when using fluoride paste in young children, a balance must be achieved between the risk of fluorosis and anti-caries effect.

Dental fluorosis is a defect in the development of enamel caused by excessive intake of fluoride compounds into the body before teeth erupt. The effect is systemic in nature and depends on the concentration of fluoride ions in the periodontal tissues during the formation of enamel. The risk of developing fluorosis and its severity determined by a wide range of factors, such as the time of fluoride intake, its amount, bioavailability, stage of tooth development, duration of admission and child’s body weight. Body weight determines the dissolution of the ingested dose. With the same amount of fluoride ingested, its concentration in the blood plasma will be higher in a child with a lower body weight. From this it follows that the effect of a certain amount of fluoride in a child aged 1 year with a body weight of approximately 10 kg will be greater than in a 5-6 year old with a body weight of 20 kg. Taking this into account, the risk of fluorosis for a certain fluoride doses can be calculated as the ratio of the amount of fluoride ingested to body weight. The first slightest signs of fluorosis appear when 0.01–0.02 mgF/kg enters the body. Limit level absorption of fluoride into the body from all sources, the excess of which may lead to the development of “unacceptable” dental fluorosis, Burt considers 0.05–0.07 mgF/kg per day and believes that this level should decrease in populations with low caries risk. When 0.1 mgF/kg body weight enters the body, “noticeable” develops dental fluorosis [15].

Unraveling the mechanism of fluoride's influence on tooth enamel, which results in fluorosis, is far from complete. But fluorides have been found to be active in the enamel maturation phase. It

is believed that fluoride, present in the extracellular matrix of developing enamel, inhibits the breakdown of proteins necessary for complete mineralization of the enamel, resulting in porosity. According to Holt R. study, when fluoride entered the body of a child under 3 years of age in an amount of less than 0.04, 0.04–0.06 and more than 0.06 mgF/kg body weight, the prevalence of fluorosis was 12.9, 23 and 32.4% respectively. Conclusion, the increase in the prevalence of fluorosis was associated with increasing the amount of fluoride consumed from all sources in the first 3 years of life [16].

Systemic impact toothpaste depends on the quantity toothpaste consumed by children when brushing their teeth, and their risk of developing fluorosis depends on the attentiveness of parents to the recommendations of dentists. In turn, the amount of toothpaste absorbed depends on the amount of toothpaste used for brushing. In table information about fluoride content in a particular amount of toothpaste squeezed onto the head of a children's toothbrush [17].

To assess the amount of fluoride absorbed during tooth brushing, ingestion of a paste with a concentration of [F-] = 500 ppm by children aged 1–3 years and aged 4–6 years. Before starting the study parents and children were not instructed in relation to the amount of extruded paste and the frequency of rinsing the mouth after brushing their teeth, so the participants performed these manipulations in the same way as they do at home [18].

Parents of young children squeezed an average of 0.23 grams of toothpaste onto their brush, which is the size of a “small pea.” The amount of paste squeezed out ranged from 0.06 to 0.72 g. More than half of the parents squeezed out the appropriate amount of paste for the child’s age - in the form of a “smear”. Children aged 4–6 years squeezed more toothpaste onto their brushes – 0.63 g. The weight of the toothpaste used ranged from 0.22 to 1.35 g. In this group, more than half of the children used an amount of toothpaste corresponding in size to brush their teeth half the head of a toothbrush, 26.1% of children squeezed out toothpaste the size of “small pea” and 17.4% of children spread the paste over the entire surface toothbrush [20].

The proportion of toothpaste consumed in young children was 60.7%, for preschoolers – 40%. The most common amount of toothpaste swallowed by children younger age ranged from 51–79%, but in some cases reached 93%, which is consistent with the data of other researchers. Preschool children most often ingested from 35 to 59% of the used toothpaste, and none of them swallowed more than 70% of the toothpaste. The amount of fluoride ingested in young children varied more than in preschool children and was closely related to the amount of toothpaste squeezed onto the brush. It was calculated that during the process of brushing teeth, young children on average received 0.08 mgF, preschool children - 0.12 mgF, which when recalculated by body weight was 0.006 and 0.007 mgF/kg/day respectively [19].

According to data, when brushing your teeth twice, the intake fluoride from toothpaste will be 0.012 mgF/kg/day in children 1–3 years old, and 0.014 mgF/kg/day in children 4–6 years old, which is two times lower than the norm.

However, today some dentists are not aware of the issues of prescribing fluoride-containing toothpastes for children. Questions arise about the age at which they can be used, the dosage of fluoride in toothpastes for children of different ages, the amount paste that can be used for daily brushing of teeth. The recommendations of different organizations are different [21].

Center for Control and Prevention diseases USA recommends use fluoride toothpastes from 2 years of age, and Australian Dental Health Research Center - from 18 months. For children under 18 months of age using fluoride toothpastes recommended strictly as prescribed by a dentist or pediatrician. The Bureau Maternal and Child Health recommends the use of fluoride toothpaste for children under 2 years of age at risk of developing caries [24].

European Academy of Pediatric Dentistry, American Academy of Pediatric Dentistry, Scottish Intercollegiate Information Organization, and German Society of Pediatric Dentistry recommend the use of fluoride-containing toothpastes for children after the eruption of their first teeth, and in WHO and British Society of Pediatric Dentistry recommendations do not mention age restrictions on the use of fluoridated toothpastes for children[23,25].

The fluoride content in toothpastes is 1000–1500 ppm, in toothpastes for children under 6 years old – up to 600 ppm. However, the recommendations of the British Society of Pediatric Dentists states that children under 6 years of age at risk of developing caries should use toothpastes with concentration 1000ppm F-. The European Academy of Pediatric Dentistry recommends using paste with a concentration of 500 ppmF, and from 2-6 years - 1000 ppmF. Toothpastes with fluoride concentrations less than 500 ppm are ineffective.

Organizations have the most consistent positions on the frequency of tooth brushing and the amount of toothpaste used by children. Children under 6 years of age should use a pea-sized amount of toothpaste and brush their teeth no more than 2 times a day under strict parental supervision. The effect of toothpaste is enhanced if, after brushing your teeth, you do not rinse your mouth, but only spit out the remaining toothpaste. F-concentration information and instructions for using toothpaste in children should indicate on packages (in the USA this recommendation is legalized). Flavoring additives have no effect on the percentage swallowing toothpaste. A number of authors report that when using toothpastes with a fluoride concentration of 1000–1100 ppm in children, the risk of developing fluorosis may be reduced if teeth are brushed after meals.

Dose of fluoride in different amounts of toothpaste

Amount of paste on the brush	F concentration in paste, mg		
	500 ppм	1000 ppм	1500 ppм
"Smear" 0.125 g	0,06	0,13	0,19
"Pea" 0.25 g	0,13	0,25	0,375
Half head baby brush 0.5g	0,35	0,5	0,75
Whole baby brush head 1g	0,5	1,0	1,5

Conclusions:

- Dental associations are inclined to support the necessity and advisability of early use of homemade fluoride toothpastes.

- With double use of fluoride toothpaste with a low fluoride concentration, possible fluoride intake in children does not exceed the daily fluoride load, provided that an amount of paste is used that does not exceed a "smear" for children under 2 years of age and a "pea" amount for children 2-6 years of age.
- Pediatric dentists should contact attention to sanitary educational work among adults on the use of toothpastes in children (amount of toothpaste used, frequency of use, concentration fluoride).
- In children at risk when prescribed fluoride-containing toothpastes can be guided by the recommendations of the European Academy of Pediatric Dentistry.

By using fluoride toothpastes correctly, caries prevention benefits can be achieved and the risk of fluorosis can be minimized.

LITERATURE

1. American Academy of Pediatric Dentistry. Policy for early childhood caries (ECC): Classifications, consequences and preventive strategies. – Pediatr. Dent. –2006. – Vol.27. – P.31–33.
2. Aoba T., Fejerskov O. // Crit. Rev. Oral. Biol. Med. – 2002. – Vol.13 (2). – P.155–170.
3. Australian Research Centre for Population Oral Health. The use of fluorides in Australia: guidelines // Aust. Dent. J. – 2006. – Vol. 51(2). – P.195–199.
4. Bratthall D., Hansel Peterson G., Sundberg H. // Eur. J. Oral. Sci. – 1996. – Vol. 104. – P.416–422.
5. Burt B.A. // J. Dent. Res. – 1992. – Vol.71 (5). – P.1228–1237.
6. Cochran J.A., Ketley C.E., Duckworth R.M. et al. // Commun. Dent. Oral. Epidemiol. – 2004. – Apr. – P.47–53.
7. Cury J.A., Del Fiol F.S., Tenuta L.M., Rosalen P.L. // J. Dent. Res. – 2005. – Vol.84 (12). – P.1133–1137.
8. Ellwood R., Fejerskov O., Cury J.A., Clarkson B. Clinical use of Fluoride // Dental Caries: The disease and its clinical management. – Blackwell Munksgaard, Oxford, 2008. – P.287–327.
9. Featherstone J.D.B. // Commun. Dent. Oral. Epidemiol. – 1999. – Vol.27. – P.31–40.
10. Guideline on fluoride therapy. American Academy of Pediatric Dentistry. Guidelines // Pediatr. Dent. – 2002. – Vol.24 (7). – P.43–122.
11. Guidelines on the use of fluoride in children: an EAPD policy document European Archives of Paediatric Dentistry. – 2009. – Vol.10 (3). – P.129–135.
12. Gussy M.G., Waters E.G., Walsh O., Kilpatrick N.M. // J. Pediatr. Child. Health. – 2006. – Vol.42. P.37–43.
13. Harris R., Nicoll A.D., Adair P.M., Pine C.M. // Commun. Dent. Health. – 2004. – Vol.21 (Suppl). – P.71–85.
14. Holt R., Nunn J., Rock P., Page J. // Int. J. Paed. Dent. – 1996. – Vol.6. – P.139–142.
15. Hong L, Levy S.M., Warren J.J. // Caries. Res. – 2006b. – Vol.40 (6). – P.494–500.
16. Hotz P.R. Dental plaque control and dental caries / N.P. Lang, R. Attstrom, H. Loe. Proceedings of the European Workshop on Mechanical Plaque Control. – Chicago: Quintessence, 1998. – P.35–49.
17. Ismail A.I. // Pediatr. Dent. – 2003. – Vol.25. – P.328–333.

18. Koch G., Lindhe J. The state of the gingivae and caries increment in school children during and after withdrawal of various prophylactic measures / McHugh WD Dental Plaque. – Edinburgh: Livingstone, 1970. – P.271–281.
19. Marinho V.C., Higgins J.P.T., Sheiham A., Logan S. Fluoride toothpastes for preventing dental caries in children and adolescents (Cochrane Review) / The Cochrane Library. – Oxford: Update Software, 2003 – Issue 1.
20. Mascarenhas A.K., Burt B.A. // Commun. Dent. Oral. Epidemiol. – 1998. – Vol.26. – P.241–248.
21. Maternal Child Health Bureau. Topical Fluoride Recommendations for High Risk Children // Expert. Panel. –2007. – October. – P. 22–23.
22. Mäkinen K.K. // J. Dent. Res. – 2000. – Vol.79(6). – P.1352–1355. 25. Moraes S.M., Pessan J.P., Ramires I., Buzalaf M.A. // Braz. Oral. Res. – 2007. – Vol.21(3). – P.234–240.
23. Pendrys D.G. // J. Am. Dent. Assoc. – 2000. – Vol. 131. – P.746–755.
24. Pieper K., Krutisch M., Volkner–Stetefeld P. // Ann. Stomatologia. – 2011. – Vol.2, N1/2. – P.41.
25. SIGN: Prevention and management of dental caries in the pre–school child // National clinical guideline. – 2005. – 43 p.